Development of RGB Composite Imagery for Operational Weather Forecasting Applications

[1]Andrew L. Molthan, [2]Kevin K. Fuell, [3]Hayden K. Oswald, and John A. Knaff[4]

[1]NASA Short-term Prediction Research and Transition (SPoRT) Center, NASA MSFC, Huntsville, Alabama
[2]University of Alabama Huntsville/SPoRT, Huntsville, Alabama
[3]University of Missouri/NASA Summer Intern Program, Columbia, Missouri
[4]NOAA/NESDIS Regional and Mesoscale Meteorology Branch, Fort Collins, Colorado
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The NASA Short-term Prediction Research and Transition (SPoRT) Center, in collaboration with the Cooperative Institute for Research in the Atmosphere (CIRA), is providing red-green-blue (RGB) color composite imagery to several of NOAA's National Centers and National Weather Service forecast offices as a demonstration of future capabilities of the Advanced Baseline Imager (ABI) to be implemented aboard GOES-R. Forecasters rely upon geostationary satellite imagery to monitor conditions over their regions of responsibility. Since the ABI will provide nearly three times as many channels as the current GOES imager, the volume of data available for analysis will increase. RGB composite imagery can aid in the compression of large data volumes by combining information from multiple channels or paired channel differences into single products that communicate more information than provided by a single channel image. A standard suite of RGB imagery has been developed by the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), based upon the Spinning Enhanced Visible and Infrared Imager (SEVIRI). The SEVIRI instrument currently provides visible and infrared wavelengths comparable to the future GOES-R ABI. In addition, the Moderate Resolution Imaging Spectroradiometer (MODIS) instruments aboard the NASA Terra and Aqua satellites can be used to demonstrate future capabilities of GOES-R.

This presentation will demonstrate an overview of the products currently disseminated to SPoRT partners within the GOES-R Proving Ground, and other National Weather Service forecast offices, along with examples of their application. For example, CIRA has used the channels of the current GOES sounder to produce an "air mass" RGB originally designed for SEVIRI. This provides hourly imagery over CONUS for looping applications while demonstrating capabilities similar to the future ABI instrument. SPoRT has developed similar "air mass" RGB imagery from MODIS, and through a case study example, synoptic-scale features evident in single-channel water vapor imagery are shown in the context of the air mass product. Other products, such as the "nighttime microphysics" RGB, are useful in the detection of low clouds and fog. Nighttime microphysics products from MODIS offer some advantages over single-channel or spectral difference techniques and will be discussed in the context of a case study. Finally, other RGB products from SEVIRI are being demonstrated as precursors to GOES-R within the GOES-R Proving Ground. Examples of "natural color" and "dust" imagery will be shown with relevant applications.